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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/016,518	11/01/2001	William John Goetzinger	ROC920010199US1	8349
31647	7590	08/24/2005	EXAMINER	
DUGAN & DUGAN, P.C. 55 SOUTH BROADWAY TARRYTOWN, NY 10591			NGO, NGUYEN HOANG	
			ART UNIT	PAPER NUMBER
			2663	

DATE MAILED: 08/24/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/016,518	GOETZINGER ET AL.	
	Examiner	Art Unit	
	Nguyen Ngo	2663	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 November 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 15-20 and 25 is/are allowed.
- 6) ☒ Claim(s) 1-7, 9-14, 21, 22, 24 and 26 is/are rejected.
- 7) ☒ Claim(s) 8 and 23 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Specification

1. The attempt to incorporate subject matter into this application by reference (page 1-page 2 and page 5 line 25) is improper because applicant has failed to provide the U.S. Patent Application Serial Number or Patent Number.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

4. Claims 1-7, 9-14, 22, 24, and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Naven et al. (US 6,810,043), hereinafter referred to as Naven.

Regarding claim 1, Naven discloses scheduling circuitry, for use to schedule cell transmissions (a scheduler for a network processor, abstract). Naven further discloses;

that the scheduling circuitry deals effectively with events that is to be scheduled at widely disparate intervals (very short and very long) without requiring the calendars to be large and without complicated processing of the calendar entries (one scheduling queue adapted to define a sequence in which flows (events) are to be serviced, abstract). Navan further discloses that the scheduling circuitry includes a master calendar for holding entries corresponding to events that are to occur within a pre-selected master-calendar range, and a slave calendar for holding entries corresponding respectively to events that are to occur beyond that scheduling range (including at least a first sub queue (master calendar) and a second sub queue (slave calendar), the first sub queue having a first range and the second sub queue having a second range that is greater than the first range, col5 lines 19-28). It should be obvious to a person skilled in the art that the master calendar contains a first resolution and the slave calendar contains a second resolution that is less than the first resolution due to the definition of resolution that the applicant has provided. On page 8 line 14, the applicant has disclosed that "resolution" is understood to mean the inverse of the distance increment that corresponds to each slot in the queue, and further states a direct inverse relationship between the resolution and the range.

Regarding claim 2, Navan discloses that the master calendar and the slave calendar are made up of a plurality of storage locations corresponding respectively to a succession of time slots (col4 lines 44-45). It can also be seen from figure 12 with correlation to figure 2, that the master calendar have the same number of time slots as

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the slave calendar correlating through figure 12 having a second order slave calendar and a first order calendar having the same number of time slots. It should be obvious to a person skilled in the art to have the master calendar and the slave calendar have the same number of time slots equivalent to the second order slave calendar and first order slave calendar (first sub queue has a number of slots that is equal to a number of slots of the second sub queue, 36 and 46 of figure 12).

Regarding claim 3, Navan discloses that the master calendar and the slave calendar are made up of a plurality of storage locations corresponding respectively to a succession of time slots (col4 lines 44-45). It can also be seen from figure 2 that the slave calendar and master calendar have a different number of time slots (the first sub queue has a number of slots that is different than a number of slots of the second queue, 7 and 2 of figure 2).

Regarding claim 4, Navan discloses a granularity of said timing information included in each entry in the slave calendar be equal to a granularity with which current time is measured (Examiner correlates granularity with resolution, col15 lines 33-36). The applicant has further disclosed that "resolution" is understood to mean the inverse of the distance increment that corresponds to each slot in the queue correlating to the range (page8 line14-16). It should thus be obvious to have the second range and the second resolution to have a direct inverse relationship.

Regarding claim 5, Navan as discussed with claim 4 discloses a granularity of said timing information included in each entry in the slave calendar be equal to a granularity with which current time is measured (Examiner correlates granularity with resolution, col15 lines 33-36). It should be obvious to have the second range and the second resolution have other than a direct inverse relationship as this a parameter is set by the user which is dependent on the number of slots.

Regarding claim 6, Navan discloses a “hierarchy” of slave calendars in which two slave calendars in hierarchy can represent different orders of magnitude of time and that if the scheduling range SR of the master calendar is 1 millisecond, the first order slave calendar will be used to deal with cells that need to be sent in the next 10 millisecond and the second order slave calendar be used to deal with cells that need to be sent in the next 100 milliseconds. Thus when a VC entered in the master calendar is processed, if the calculated next schedule time (NST) is greater than 10 milliseconds, that VS is rescheduled in the second order slave calendar. If, however, its calculated NST is greater than the scheduling range SR (1 millisecond) of the master calendar but less than 10 milliseconds, it is rescheduled in the first order slave calendar (scheduling queue includes a third sub queue (second order slave calendar) having a third range that is greater than the second range, col14 lines 10-26). It should be obvious as stated in claim 1 that the third resolution is less than the second resolution.

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Regarding claim 7, Navan discloses scheduling circuitry comprising a master calendar and a slave calendar in which to schedule cell transmissions (a scheduler for a network processor, the scheduler comprising a scheduling queue in which flows are enqueued, Abstract). Navan however fails to disclose the specific limitations of claim 7, more specifically the formula of $CP + ((WF \times FS)/SF)$. Navan however discloses using known techniques are used in which the “the next scheduled time” or NST at which the next cell for the specified VC is to be transmitted is calculated (col5 lines 5-8) and further discloses that if the NST is within the scheduling range SR of the master calendar (first sub queue), a new entry for the specified VC is made in an appropriate one of the storage locations of the master calendar, and if on the other hand, the NST is outside the scheduling range SR of the master calendar, the specified VC is instead entered in one of the storage locations of the slave calendar (second sub queue), which storage location is also used to store the NST for the specified VC (the flow appointed for enqueueing is enqueued to the first sub queue if the value of the expression is less than a range of the first sub queue and the flow appointed for enqueueing is enqueued to the second sub queue if the value of the expression is greater than a arrange of the first sub queue, col5 lines 19-29). Navan thus provides the motivation of a need for a formula to effectively calculate the NST.

The applicant has disclosed of a well known formula, more precisely, a known weighted fair queue technique ($CP + ((WF \times FS)/SF)$) in which flows are enqueued to the scheduling queue based on the formula that takes into account both a length of a data

frame associated with a flow to be enqueued and a weight which corresponds to a QoS to which the flow is entitled (page 6 and page 7).

It should thus be obvious to incorporate the well known weighted fair queue technique $(CP + (WF \times FS)/SF)$ disclosed by the applicant into the scheduling circuitry to schedule cell transmissions including a master calendar and a slave calendar disclosed by Naven in order to effectively calculated the NST.

Regarding claim 9, Navan discloses that the master calendar and the slave calendar are made up of a plurality of storage locations corresponding respectively to a succession of time slots (col4 lines 44-45). It can also be seen from figure 12 with correlation to figure 2, that the master calendar have the same number of time slots as the slave calendar correlating through figure 12 having a second order slave calendar and a first order calendar having the same number of time slots. It should be obvious to a person skilled in the art to have the master calendar and the slave calendar have the same number of time slots equivalent to the second order slave calendar and first order slave calendar (first sub queue has a number of slots that is equal to a number of slots of the second sub queue, 36 and 46 of figure 12).

Regarding claim 10, Navan discloses that the master calendar and the slave calendar are made up of a plurality of storage locations corresponding respectively to a succession of time slots (col4 lines 44-45). It can also be seen from figure 2 that the

slave calendar and master calendar have a different number of time slots (the first sub queue has a number of slots that is different than a number of slots of the second queue, 7 and 2 of figure 2).

Regarding claim 11, Navan discloses that the scheduling circuitry includes a master calendar for holding entries corresponding to events that are to occur within a pre-selected master-calendar range, and a slave calendar for holding entries corresponding respectively to events that are to occur beyond that scheduling range (the first sub queue having a first range and the second sub queue having a second range that is larger than the first range, col5 lines 19-28). It should be obvious to a person skilled in the art that the master calendar contains a first resolution and the slave calendar contains a second resolution that is less than the first resolution due to the definition of resolution that the applicant has provided. On page 8 line 14, the applicant has disclosed that "resolution" is understood to mean the inverse of the distance increment that corresponds to each slot in the queue, and further states a direct inverse relationship between the resolution and the range, thus correlating to a second sub queue that has a resolution that is less than a resolution of the first sub queue.

Regarding claim 12, Naven discloses scheduling circuitry, for use to schedule cell transmissions (a scheduler for a network processor, abstract). Naven further discloses; that the scheduling circuitry deals effectively with events that is to be scheduled at widely disparate intervals (very short and very long) without requiring the calendars to

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be large and without complicated processing of the calendar entries (one scheduling queue adapted to define a sequence in which flows (events) are to be serviced, abstract). Navan further discloses that the scheduling circuitry includes a master calendar for holding entries corresponding to events that are to occur within a pre-selected master-calendar range, and a slave calendar for holding entries corresponding respectively to events that are to occur beyond that scheduling range (a plurality of sub queues, wherein each successive one of the sub queues has a selected range that is greater than a range of a preceding sub queue, col5 lines 19-28). It should be obvious to a person skilled in the art that the master calendar contains a first resolution and the slave calendar contains a second resolution that is less than the first resolution due to the definition of resolution that the applicant has provided. On page 8 line 14, the applicant has disclosed that "resolution" is understood to mean the inverse of the distance increment that corresponds to each slot in the queue, and further states a direct inverse relationship between the resolution and the range (selected resolution that is less than a resolution of the preceding sub queue).

Regarding claim 13, Navan discloses scheduling circuitry comprising a master calendar and a slave calendar in which to schedule cell transmissions (a scheduler for a network processor, the scheduler comprising a scheduling queue in which flows are enqueued,

Abstract). Navan however fails to disclose the specific limitations of claim 7, more specifically the formula of $CP + ((WF \times FS)/SF)$. Navan however discloses using known

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techniques are used in which the “the next scheduled time” or NST at which the next cell for the specified VC is to be transmitted is calculated (col5 lines 5-8) and further discloses that if the NST is within the scheduling range SR of the master calendar (first sub queue), a new entry for the specified VC is made in an appropriate one of the storage locations of the master calendar (enqueueing a flow to a first sub queue if the expression has a value that is less than a range of the first sub queue), and if on the other hand, the NST is outside the scheduling range SR of the master calendar, the specified VC is instead entered in one of the storage locations of the slave calendar (second sub queue), which storage location is also used to store the NST for the specified VC (enqueueing the flow to a second sub queue if the expression has a value that is greater than the range of the first sub queue, col5 lines 19-29). Navan thus provides the motivation of a need for a formula to effectively calculate the NST.

The applicant has disclosed of a well known formula, more precisely, a known weighted fair queue technique $(CP + ((WF \times FS)/SF))$ in which flows are enqueueued to the scheduling queue based on the formula that takes into account both a length of a data frame associated with a flow to be enqueueued and a weight which corresponds to a QoS to which the flow is entitled (page 6 and page 7).

It should thus be obvious to incorporate the well known weighted fair queue technique $(CP + (WF \times FS)/SF)$ disclosed by the applicant into the scheduling circuitry

to schedule cell transmissions including a master calendar and a slave calendar disclosed by Naven in order to effectively calculated the NST.

Regarding claim 14, Naven discloses that the scheduling circuitry includes a master calendar for holding entries corresponding to events that are to occur within a pre-selected master-calendar range, and a slave calendar for holding entries corresponding respectively to events that are to occur beyond that scheduling range (second sub queue has a range that is larger than the range of the first sub queue, col5 lines 19-28). It should be obvious to a person skilled in the art that the master calendar contains a first resolution and the slave calendar contains a second resolution that is less than the first resolution due to the definition of resolution that the applicant has provided. On page 8 line 14, the applicant has disclosed that “resolution” is understood to mean the inverse of the distance increment that corresponds to each slot in the queue, and further states a direct inverse relationship between the resolution and the range (the second sub queue has a resolution that is less than a resolution of the first sub queue).

Regarding claim 22, Naven discloses scheduling circuitry and method, for use to schedule cell transmissions (a scheduler for a network processor, abstract). Naven further discloses that the scheduling circuitry deals effectively with events that are to be scheduled at widely disparate intervals (very short and very long) without requiring the calendars to be large and without complicated processing of the calendar entries (scheduling queue adapted to define a sequence in which flows are to be serviced,

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abstract). Navan further discloses that the scheduling circuitry includes a master calendar for holding entries corresponding to events that are to occur within a pre-selected master-calendar range, and a slave calendar for holding entries corresponding respectively to events that are to occur beyond that scheduling range (including at least a first sub queue (master calendar) and a second sub queue (slave calendar), the first sub queue having a first range and the second sub queue having a second range that is greater than the first range, col5 lines 19-28). It should be obvious to a person skilled in the art that the master calendar contains a first resolution and the slave calendar contains a second resolution that is less than the first resolution due to the definition of resolution that the applicant has provided. On page 8 line 14, the applicant has disclosed that "resolution" is understood to mean the inverse of the distance increment that corresponds to each slot in the queue, and further states a direct inverse relationship between the resolution and the range. Naven further discloses;

using known techniques in which the "the next scheduled time" or NST at which the next cell for the specified VC is to be transmitted is calculated using the A pointer to identify the currently-serviced storage location (determining distance from a current pointer at which a flow is to be attached, col5 lines 1-8).

that if the NST is within the scheduling range SR of the master calendar (first sub queue), a new entry for the specified VC is made in an appropriate one of the storage locations of the master calendar (determining if the distance is less than the first range of the first sub queue, and if so, attaching the flow to the first sub queue),

and if on the other hand, the NST is outside the scheduling range SR of the master calendar, the specified VC is instead entered in one of the storage locations of the slave calendar (second sub queue), which storage location is also used to store the NST for the specified VC (determining if the distance is greater than the first range of the first sub queue, and if so, attaching the flow to the second sub queue, col5 lines 19-29).

Regarding claim 24, Naven discloses all the limitations of claim 24 as discussed with claim 22. It should be noted that claim 24 is simply the computer program containing the methods of claim 22, and it should be obvious to have a medium readable by a computer to implement the same steps for the method of claim 22.

Regarding claim 26, Naven discloses all the limitations of claim 26 as discussed with claim 13. It should be noted that claim 26 is simply the computer program containing the methods of claim 13, and it should be obvious to have a medium readable by a computer to implement the same steps for the method of claim 13.

5. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Naven et al. (US 6810043) in view of Mysore et al. (US 6810426), hereinafter referred to as Naven and Mysore.

Regarding claim 21, Naven discloses scheduling circuitry, for use to schedule cell transmissions (a scheduler for a network processor, abstract). Naven further discloses;

that the scheduling circuitry includes a master calendar for holding entries corresponding to events that are to occur within a pre-selected master-calendar range, and a slave calendar for holding entries corresponding respectively to events that are to occur beyond that scheduling range (at least a first scheduling queue that includes at least a first sub queue and a second sub queue, col5 lines 19-28).

Navan however fails to disclose of the specific limitation of a dequeuing from the scheduling queue by searching the first and second sub queues for respective winning flows.

Mysore however discloses a process that dequeues packets from multiple queues (first and second sub queues) in an order based upon an algorithm that arranges and dequeues those queues having the highest priority (winning flow) based on content therein (select a flow for dequeuing from the scheduling queue by searching the first and second sub queues for respective winning flows and selecting one of the winning flows for dequeuing, col5 lines 8-15) and thus provides the motivation for dequeuing packets based on the type of data included within the data packet, the type of data flow, or another attribute of the packet in order to efficiently schedule cell transmissions from a scheduling queue.

It should thus be obvious to a person skilled in the art to incorporate the process for dequeuing packets from multiple queues (or sub queues) disclosed by Mysore with

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the scheduling circuitry to schedule cell transmissions including a master calendar and a slave calendar disclosed by Naven in order to efficiently dequeue the calendars (sub queues) for correct cell transmissions.

Allowable Subject Matter

6. Claims 8, and 23 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

7. Claim 8 is allowable due to the further limitations the least significant digits of the CP pointer being applied to the first sub queue and the most significant digits of the CP pointer being applied to the second sub queue.

8. Claim 23 is allowable due to the further limitations of scaling the distance prior to attaching the flow to the second sub queue.

9. Claims 15-20 and 25 are allowed.

The following is a statement of reasons for the indication of allowable subject matter:

10. Claims 15 and 25 is are allowable over the prior art of record since the cited references taken individually or in combination fails to particularly disclose **determining a first and second sub queue distance corresponding to a distance between the**

current pointer and a slot in which the first or second winning flow is enqueued

and comparing the first and second queue distances. It is noted that the closest prior art, Naven et al. (US 6810043) shows the method incorporating scheduling circuitry which includes a master calendar (first sub queue) for holding entries corresponding to events that are to occur within a pre-selected master-calendar range, and a slave calendar (second sub queue) for holding entries corresponding respectively to events that are to occur beyond that scheduling range. However, Naven et al. fails to disclose or render obvious to the above underline limitations as claimed.

Conclusion

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

a) Bauman et al. (U.S 6160812) Method and Apparatus For Supplying Request to A Scheduler in an Input Buffered Multiport Switch.

b) Yang et al. (U.S 5905730) High Speed Packet Scheduling Method and Apparatus.

c) Ohba (U.S 6101193) Packet Scheduling Scheme For Improving Short Time Fairness Characteristic In Weighted Fair Queueing.

d) Fan et al. (U.S 6389019) Time-Based Scheduler Architecture and Method For ATM Networks.

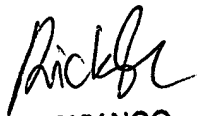
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nguyen Ngo whose telephone number is (571) 272-8398. The examiner can normally be reached on Monday-Friday 7am - 3:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ricky Ngo can be reached on (571) 272-3139. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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8/24/05